SONY

CXP87532/87540

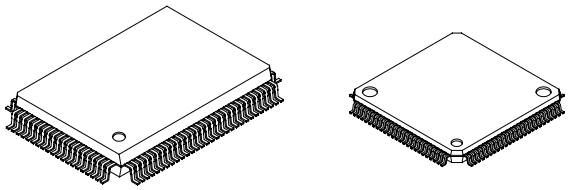
CMOS 8-bit Single Chip Microcomputer

Description

The CXP87532/87540 is a CMOS 8-bit microcomputer which consists of arithmetic coprocessor, A/D converter, serial interface, timer/counter, time base timer, vector interruption, high precision timing pattern generation circuit, PWM generator and the measuring circuit which measures signals of capstan FG, drum FG/PG, reel FG and other servo systems, as well as basic configurations like 8-bit CPU, ROM, RAM and I/O port. They are integrated into a single chip.

Also this IC provides power on reset function, sleep/stop function which enables to lower power consumption.

100 pin QFP (Plastic) 100 pin LQFP (Plastic)



Structure

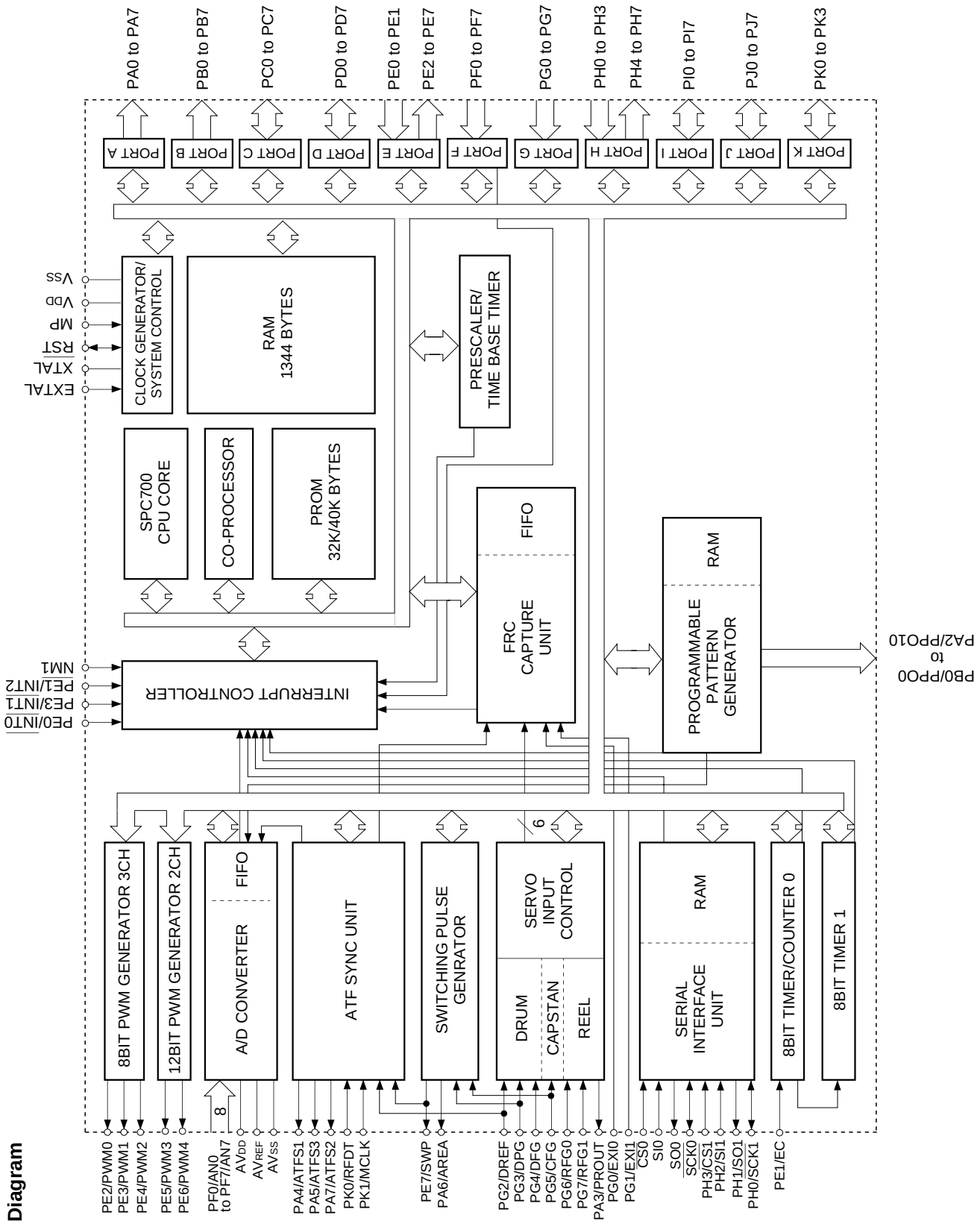
Silicon gate CMOS IC

Features

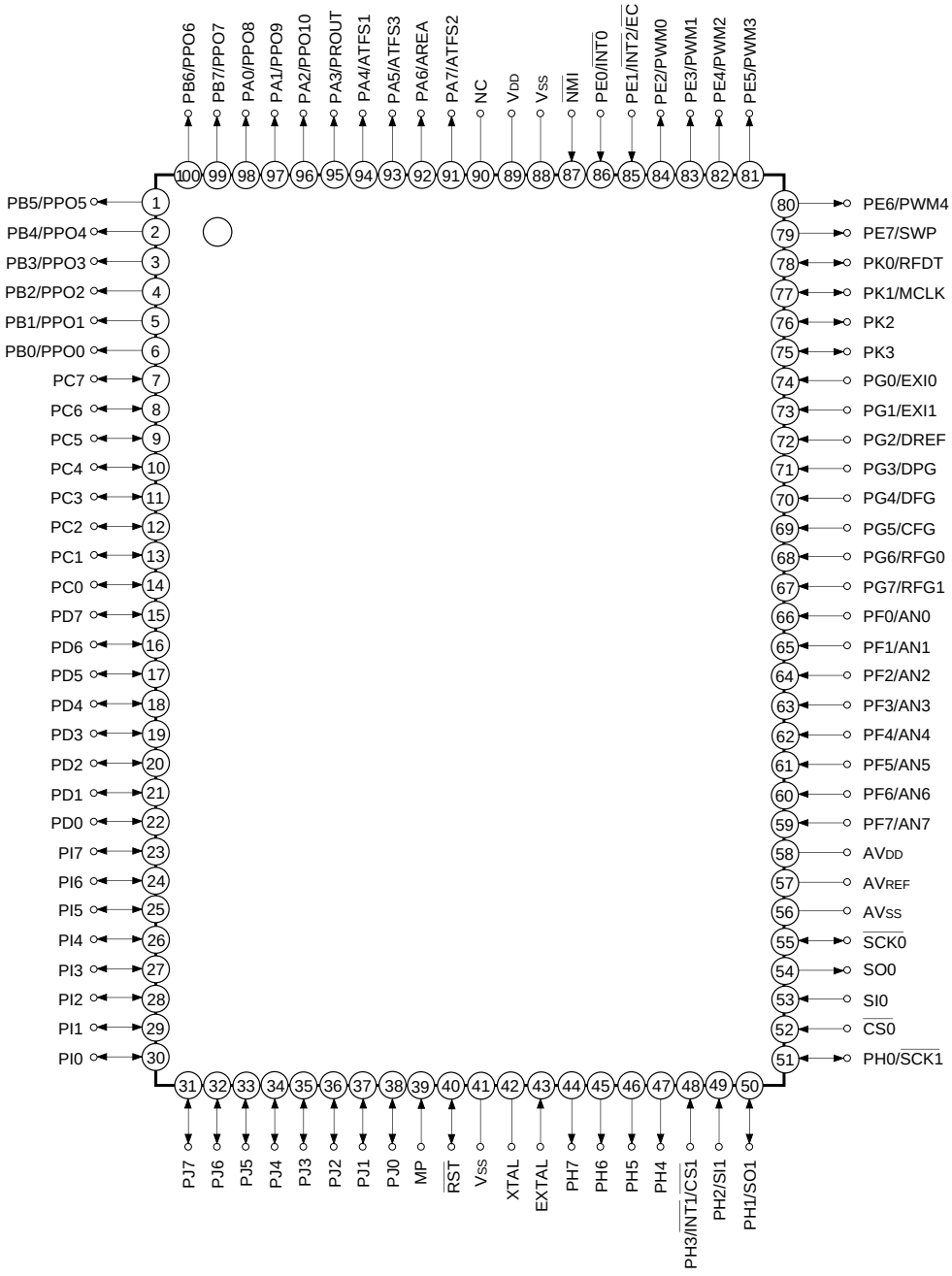
- A wide instruction set (213 instructions) which covers various types of data
  — 16-bit operation multiplycation and division/boolean bit operation instructions
- Minimum instruction cycle During operation 326ns/12.288MHz
- Incorporated ROM capacity 32K bytes (CXP87532)
  40K bytes (CXP87540)
- Incorporated RAM capacity 1344 bytes
- Peripheral functions
  - — Arithmetic coprocessor: Multiplying with code, sum of products with code, high speed execution of many bits shift rotation operation
  - — A/D converter: 8-bit, 8-channel, successive approximation system (Conversion time 13µs/12.288MHz) Incorporated 3-stage FIFO for A/D conversion data
  - — Serial interface: Incorporated buffer RAM for data (1 to 128 bytes auto transfer) 2-channel
  - — Timer: 8-bit timer, 8-bit timer/counter, 19-bit time base timer
  - — High precision timing pattern generator: PPG (11 pins) 32-stage programmable
  - — PWM output: 12-bit, 2-channel (Repeated frequency 48kHz) 8-bit, 3-channel (Repeated frequency 48kHz)
  - — Servo input control: Capstan FG, Drum FG/PG, Reel FG input
  - — FRC capture unit: Incorporated 28-bit and 8-stage FIFO
- Interruption: 12 factors, 12 vectors, multi-interruption possible
- Standby mode: Sleep/stop
- Package: 100-pin plastic QFP/LQFP
- Piggyback/Evaluation: CXP87500 100-pin ceramic QFP/LQFP

E93820B16-PS

Block Diagram

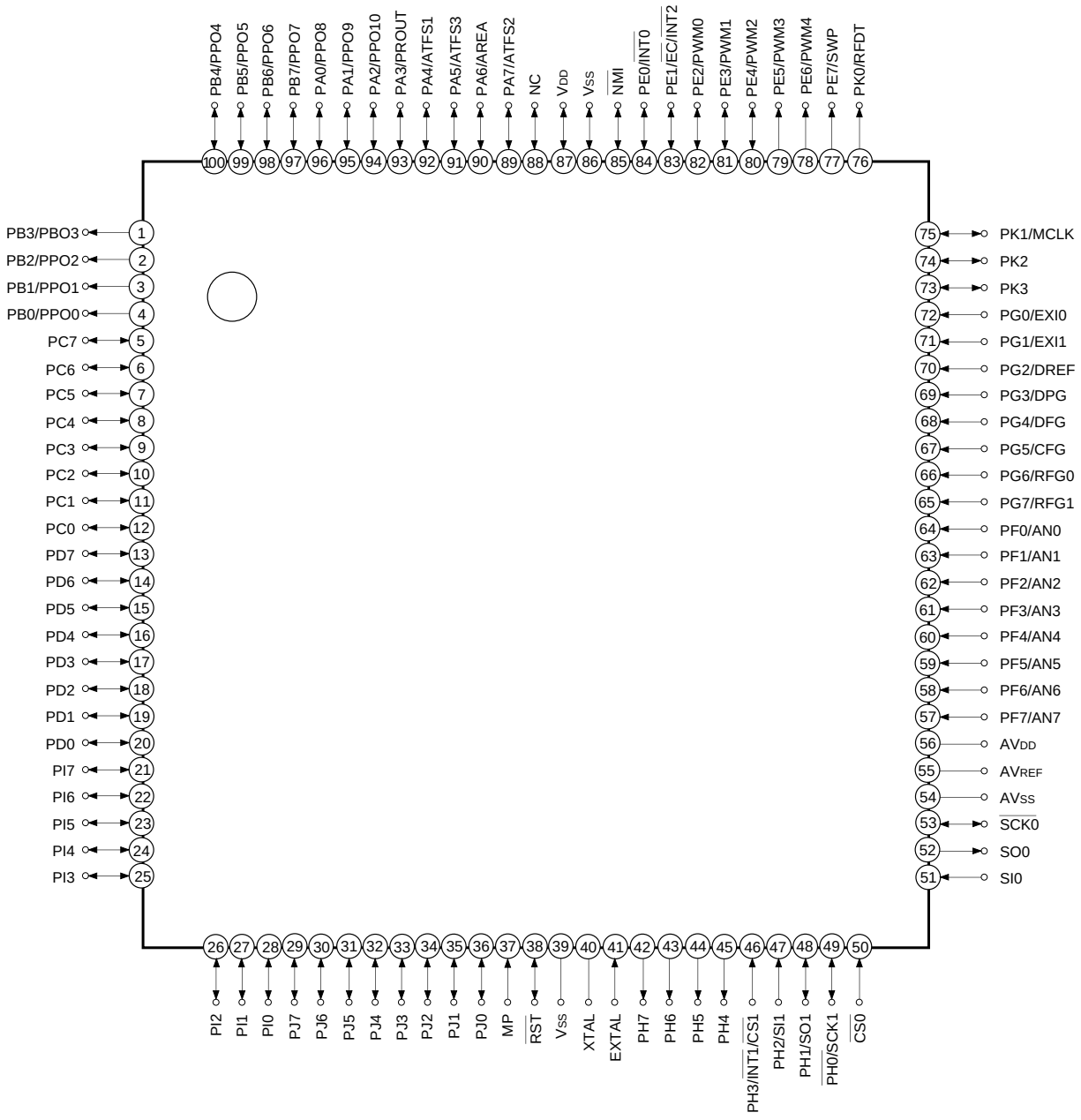


Pin Assignment 1 (Top View) 100pin QFP



Note) 1. NC (Pin 90) is always connected to V_{DD}.
2. V_{SS} (Pins 41 and 88) are both connected to GND.
3. MP (Pin 39) is always connected to V_{SS}.

Pin Assignment 2 (Top View) 100pin LQFP



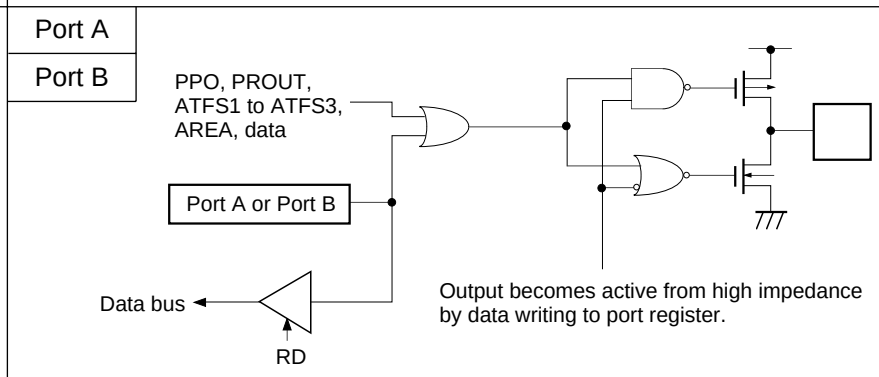
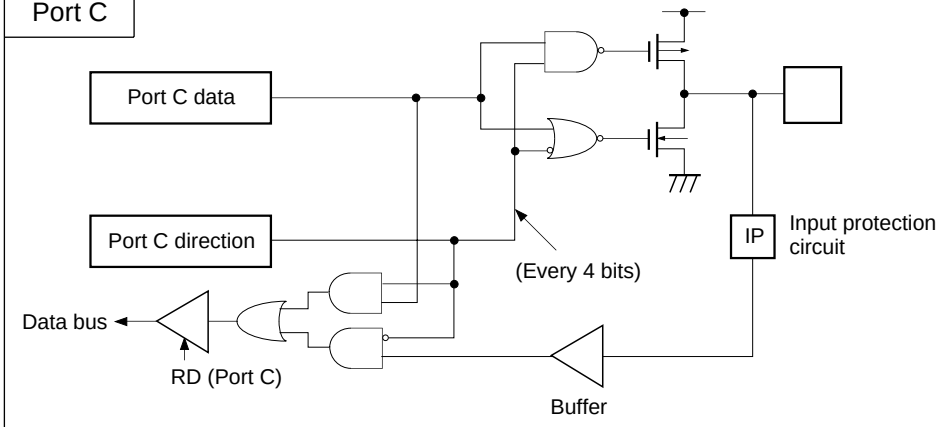
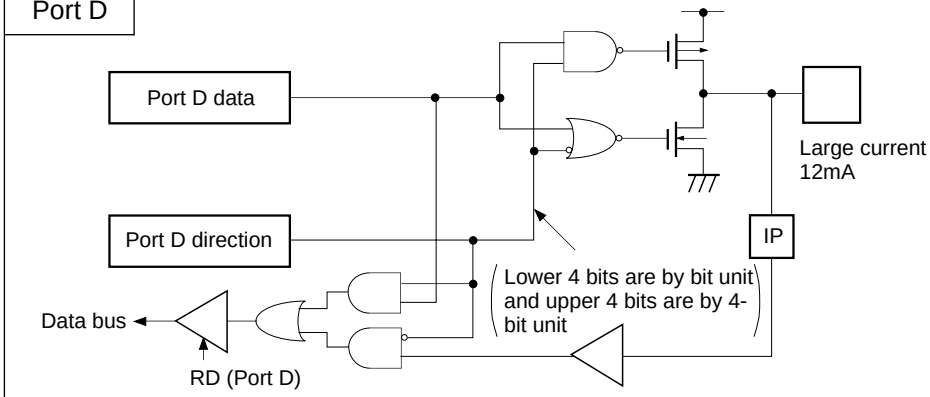
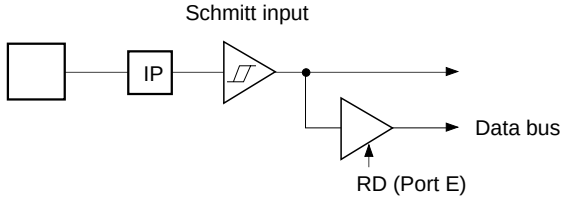
Note) 1. NC (Pin 88) is always connected to V_{DD}.
2. V_{SS} (Pins 39 and 86) are both connected to GND.
3. MP (Pin 37) is always connected to V_{SS}.

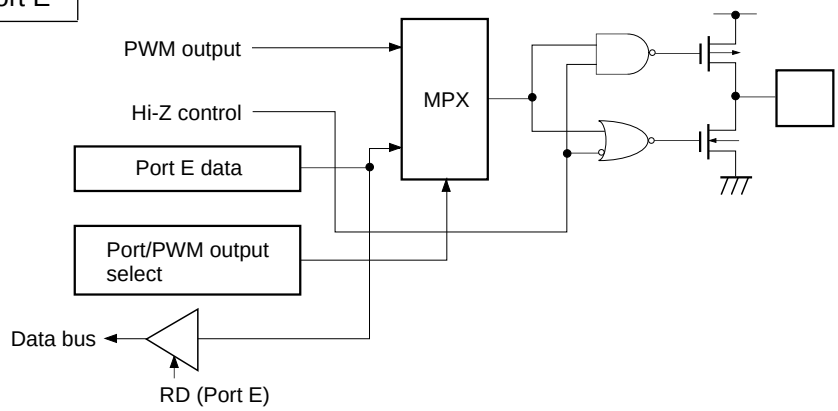
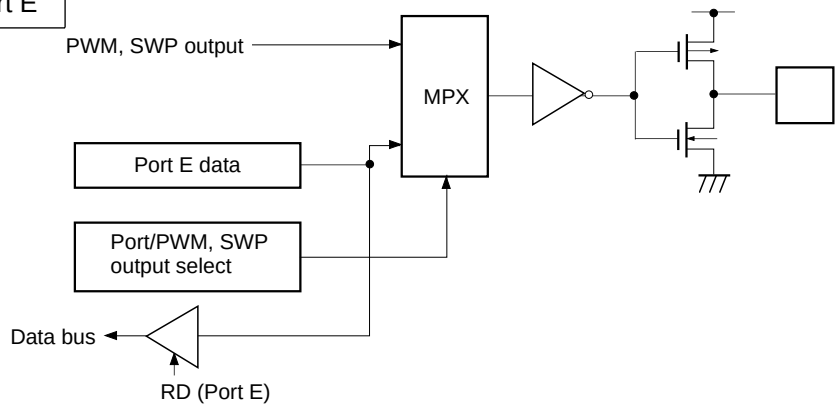
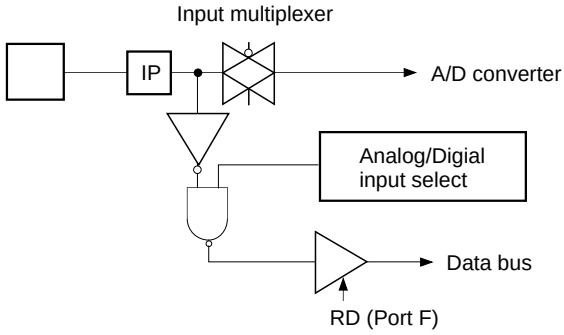
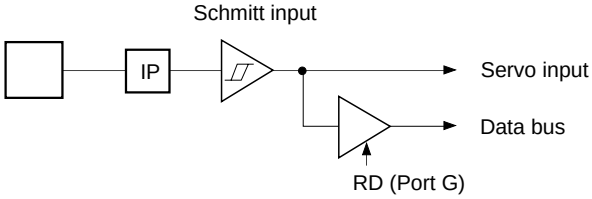
Pin Description

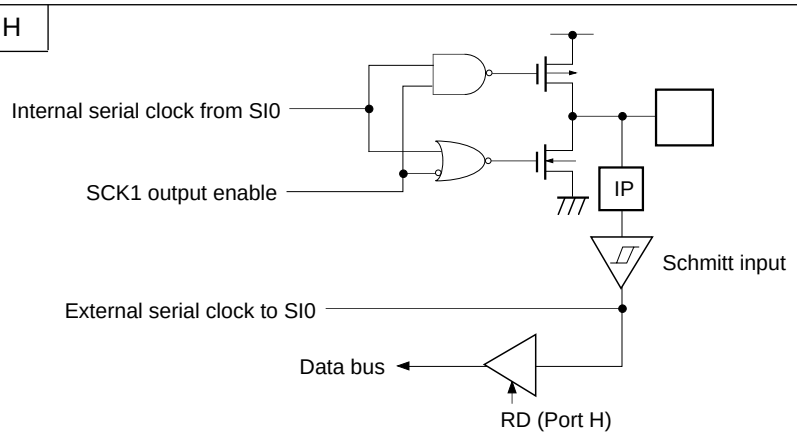
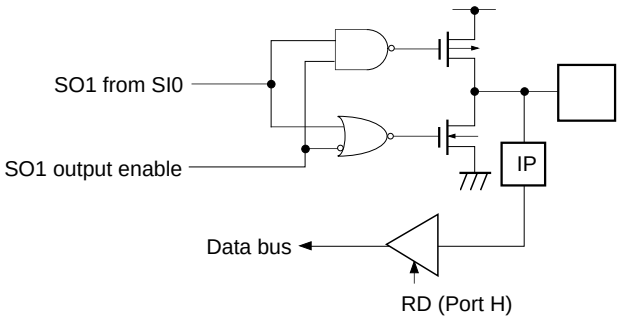
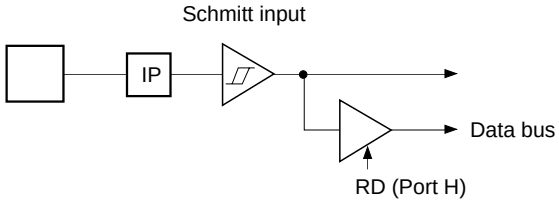
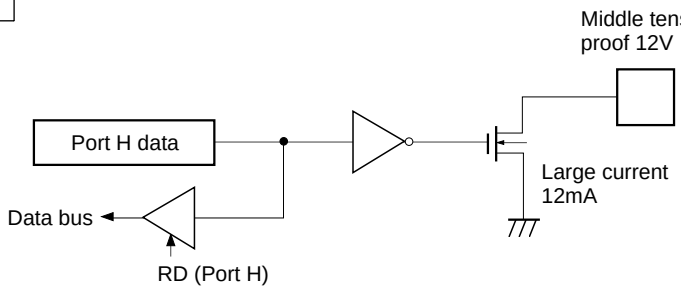
Symbol	I/O	Description		
PA0/PPO8 PA1/PPO9 PA2/PPO10 PA3/PROUT	Output/ Real time output	(Port A) 8-bit output port. Data is gated with PPO (3 pins), monitor signal (4 pins) in relation to ATF, control signal (1 pin) for capstan servo by OR-gate and they are output. (8 pins)	Programmable pattern generator (PPG) Output (3 pins) and capstan servo control signal (1 pin).	
PA4/ATFS1 PA5/ATFS3 PA6/AREA PA7/ATFS2	Output/ Monitor output		Monitor output in relation to ATF. (4 pins)	
PB0/PPO0 to PB7/PPO7	Output/ Real time output	(Port B) 8-bit output port. Data is gated with PPO by OR-gate and they are output. (8 pins)	Programmable pattern generator (PPG) output. (8 pins)	
PC0 to PC7	I/O	(Port C) 8-bit input/output port, enables to specify input/output by 4-bit unit. (8 pins)		
PD0 to PD7	I/O	(Port D) 8-bit input/output port. Lower 4 bits can be specified as input/output by bit unit and upper 4 bits can be specified as input/output by 4-bit unit. (8 pins)		
PE0/$\overline{\text{INT0}}$	Input/Input	(Port E) 8-bit port. Lower 2 bits are input pins and upper 6 bits are output pins. (8 pins)	Input pin to request external interruption. Active when falling edge.	
PE1/$\overline{\text{EC}}$/$\overline{\text{INT2}}$	Input/Input/ Input		External event input pin for timer/counter.	Input pin to request external interruption. Active when falling edge.
PE2/PWM0 to PE6/PWM4	Output/Output		PWM output pins (5 pins)	
PE7/SWP	Output/Output		SWP output pin.	
PF0/AN0 to PF7/AN7	Input/Input	(Port F) 8-bit input port. (8 pins) Upper 4 bits serve as standby release input pin.	Analog input pins to A/D converter. (8 pins)	
PG0/EXI0	Input/Input	(Port G) 8-bit input port. (8 pins)	External input pin 0.	
PG1/EXI1	Input/Input		External input pin 1.	
PG2/DREF	Input/Input		Drum reference signal input pin.	
PG3/DPG	Input/Input		Drum PG input pin.	
PG4/DFG	Input/Input		Drum FG input pin.	
PG5/CFG	Input/Input		Capstan FG input pin.	
PG6/RFG0	Input/Input		Reel FG input pin.	
PG7/RFG1	Input/Input			

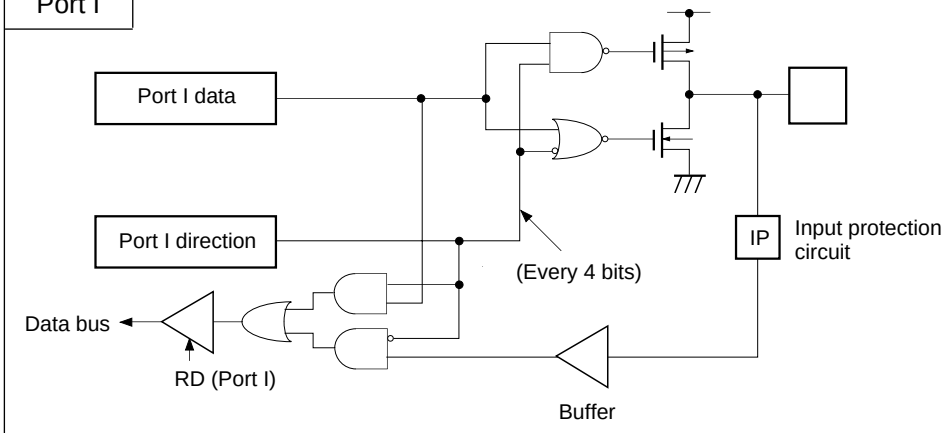
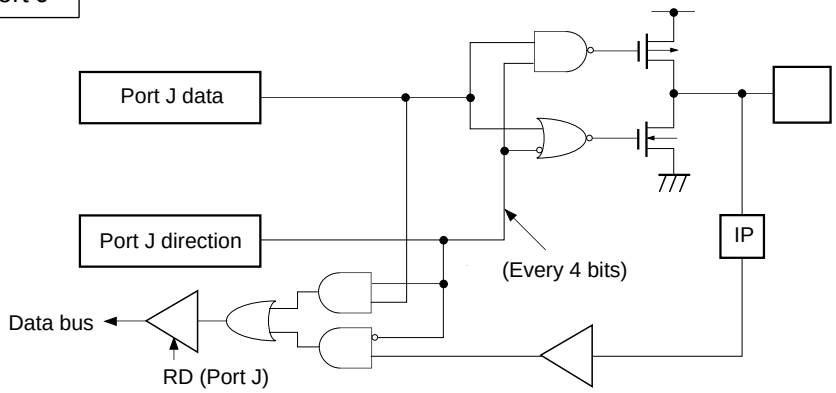
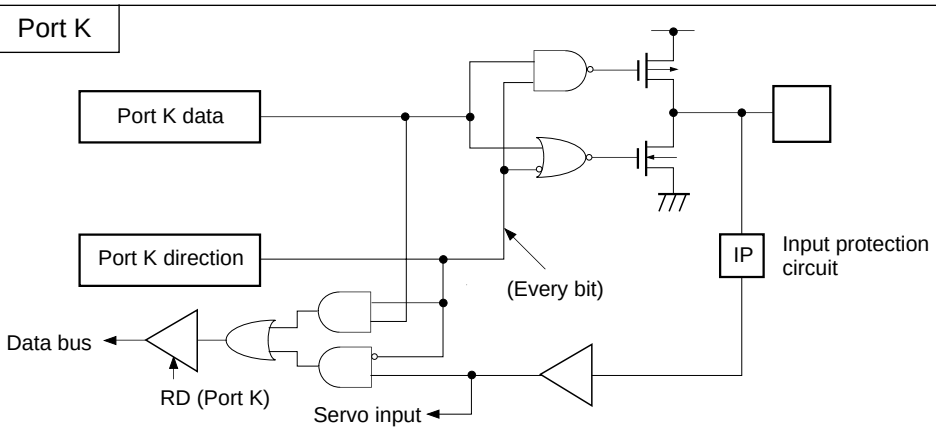
Symbol	I/O	Description	
PH0/$\overline{\text{SCK1}}$	Input/I/O	(Port H) 4-bit input port. (4 pins)	Serial clock input/output pin.
PH1/SO1	Input/Output		Serial data output pin.
PH2/SI1	Input/Input		Serial data input pin.
PH3/$\overline{\text{INT1}}$/ $\overline{\text{CS1}}$	Input/Input/Input	Input pin to request external interruption. Active when falling edge.	Chip select input pin to serial interface.
PH7 to PH4	Output	(Port H) 4-bit output port. N-ch open drain output of middle tension proof (12V) and large current (12mA). (4 pins)	
PI0 to PI7	I/O	(Port I) 8-bit input/output port, enables to specify input/output by 4-bit unit. (8 pins)	
PJ0 to PJ7	I/O	(Port J) 8-bit input/output port, enables to specify input/output by 4-bit unit. (8 pins)	
PK0/RFDT	I/O/Input	(Port K) 4-bit input/output port, enables to specify input/ output by bit unit. (4 pins)	Playback data input pin.
PK1/MCLK	I/O/Input		Channel clock input pin.
PK2, PK3	I/O		
$\overline{\text{SCK0}}$	I/O	Serial clock input/output pin.	
SO0	Output	Serial data output pin.	
SI0	Input	Serial data input pin.	
$\overline{\text{CS0}}$	Input	Chip select input pin to serial interface.	
$\overline{\text{NMI}}$	Input	Non-maskable interrupt request pin. Active during falling edge.	
EXTAL	Input	Connecting pin of crystal oscillator for system clock. When supplying the external clock, input the external clock to EXTAL pin and set XTAL pin to open.	
XTAL	Output		
$\overline{\text{RST}}$	I/O	System reset pin of active “L” level. $\overline{\text{RST}}$ pin is input/output pin, which output “L” level by incorporated power on reset function when power ON. (Mask option)	
MP	Input	Test mode pin. This pin is always connected to GND.	
AV_{DD}		Positive power supply pin of A/D converter. Set the same voltage as V_{DD}.	
AV_{REF}	Input	Reference voltage input pin of A/D converter.	
AV_{SS}		GND pin of A/D converter.	
V_{DD}		Positive power supply pin.	
V_{SS}		GND pin. Connect both V_{SS} pins to GND.	

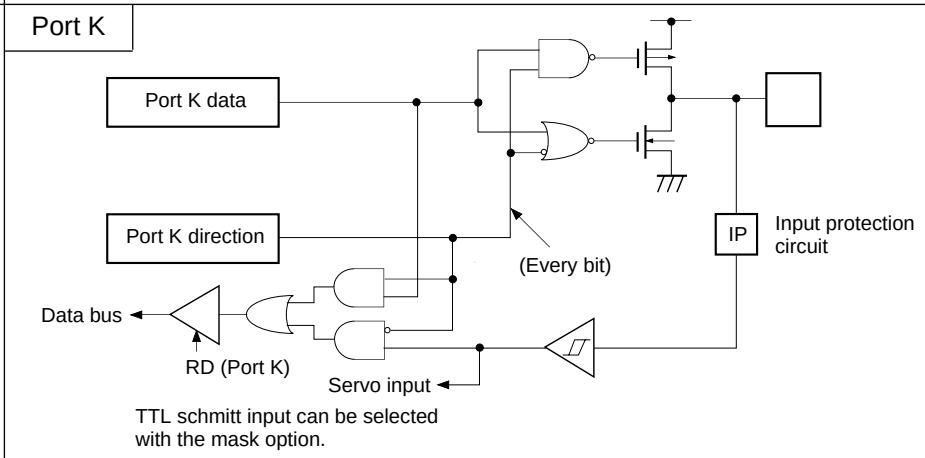
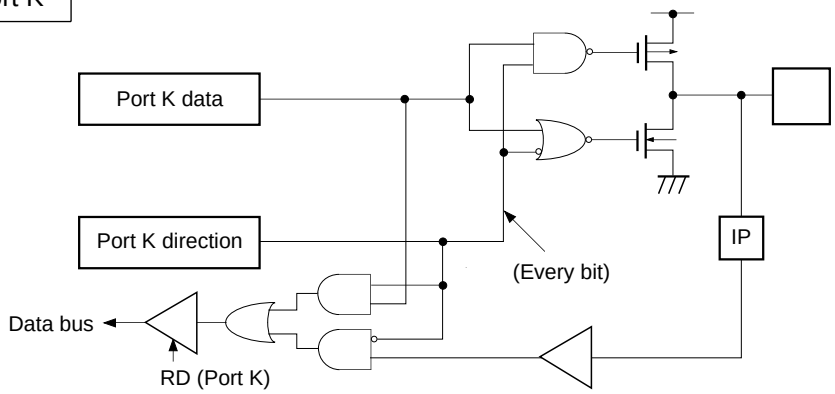
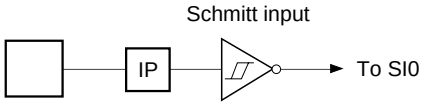
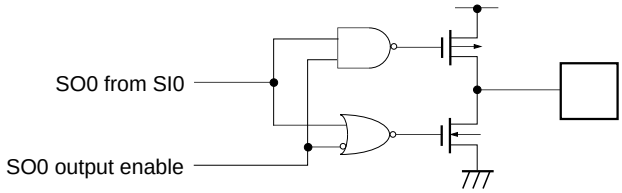
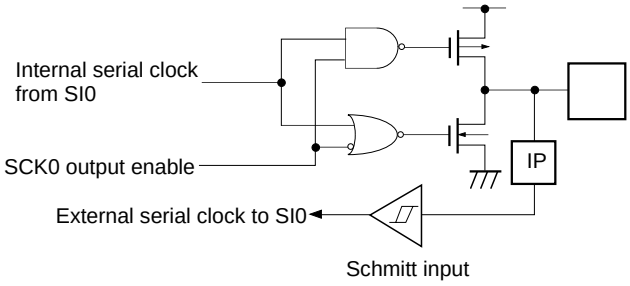
I/O Circuit Formats for Pins

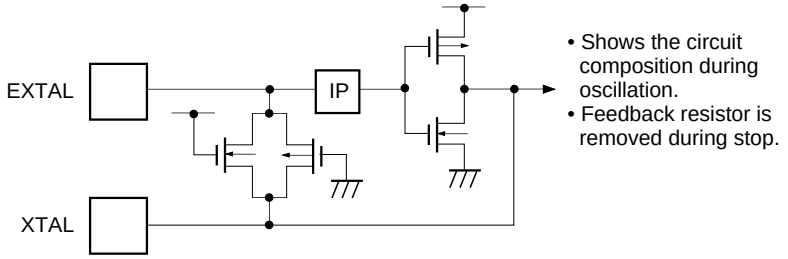
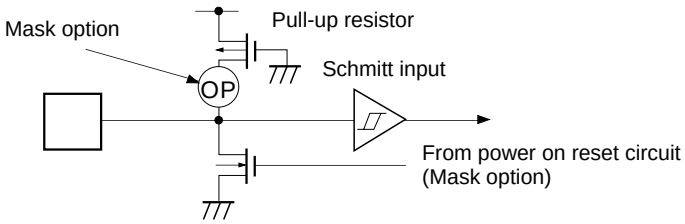
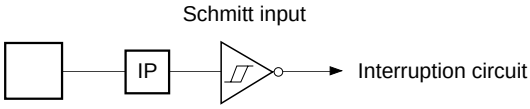
Pin	Circuit format	When reset
PA0/PPO8 to PA2/PPO10 PA3/PROUT PA4/ATFS1 PA5/ATFS3 PA6/AREA PA7/ATFS2 PB0/PPO0 to PB7/PPO7 16 pins	Port A Port B 	Hi-Z
PC0 to PC7 8 pins	Port C 	Hi-Z
PD0 to PD7 8 pins	Port D 	Hi-Z
PE0/$\overline{\text{INT0}}$ PE1/$\overline{\text{EC}}$/ $\overline{\text{INT2}}$ 2 pins	Port E 	Hi-Z

Pin	Circuit format	When reset
PE2/PWM0 PE3/PWM1 PE4/PWM2 PE5/PWM3 4 pins	Port E 	Hi-Z
PE6/PWM4 PE7/SWP 2 pins	Port E 	H level
PF0/AN0 to PF7/AN7 8 pins	Port F 	Hi-Z
PG0/EXI0 PG1/EXI1 PG2/DREF PG3/DPG PG4/DFG PG5/CFG PG6/RFG0 PG7/RFG1 8 pins	Port G  For PG0/EXI0 to PG7/RFG1, TTL schmitt input can be selected with the mask option.	Hi-Z

Pin	Circuit format	When reset
PH0/$\overline{\text{SCK1}}$ 1 pin	Port H 	Hi-Z
PH1/SO1 1 pin	Port H 	Hi-Z
PH2/$\overline{\text{SI1}}$ PH3/$\overline{\text{CS1}}$/ $\overline{\text{INT1}}$ 2 pins	Port H 	Hi-Z
PH4 to PH7 4 pins	Port H 	Open

Pin	Circuit format	When reset
PI0 to PI7 8 pins	Port I 	Hi-Z
PJ0 to PJ7 8 pins	Port J 	Hi-Z
PK0/RFDT 1 pin	Port K  Buffer amplifier input can be selected with the mask option.	Hi-Z When buffer amplifier input is selected, pulled up internally during standby.

Pin	Circuit format	When reset
PK1/MCLK 1 pin	Port K  TTL schmitt input can be selected with the mask option.	Hi-Z
PK2 to PK3 2 pins	Port K  	Hi-Z
$\overline{\text{CS0}}$ SI0 2 pins	 	Hi-Z
SO0 1 pin	 	Hi-Z
$\overline{\text{SCK0}}$ 1 pin	 	Hi-Z

Pin	Circuit format	When reset
EXTAL XTAL 2 pins		Oscillation
$\overline{\text{RST}}$ 1 pin		L level
$\overline{\text{NMI}}$ 1 pin		Hi-Z

Absolute Maximum Ratings (V_{SS} = 0V reference)

Item	Symbol	Ratings	Unit	Remarks
Power supply voltage	V_{DD}	–0.3 to +7.0	V	
	AV_{DD}	AV_{SS} to +7.0*1	V	
	AV_{SS}	–0.3 to +0.3	V	
Input voltage	V_{IN}	–0.3 to +7.0*2	V	
Output voltage	V_{OUT}	–0.3 to +7.0*2	V	
Middle tension proof output voltage	V_{OUTP}	–0.3 to +15.0	mA	PH pin
High level output current	I_{OH}	–5	mA	
High level total output current	$\sum I_{OH}$	–50	mA	Total of entire output pins
Low level output current	I_{OL}	15	mA	Other than large current output pins : per pin
	I_{OLC}	20	mA	Large current port pin *3 : per pin
Low level total output current	$\sum I_{OL}$	130	mA	Total of entire output pins
Operating temperature	Topr	–20 to +75	°C	
Storage temperature	Tstg	–55 to +150	°C	
Allowable power dissipation	P_D	600	mW	QFP package
		380		LQFP package

*1 AV_{DD} and V_{DD} should be set to the same voltage.

*2 V_{IN} and V_{OUT} should not exceed V_{DD} + 0.3V

*3 The large current operation transistors are the N-ch transistors of the PD and PH4 to PH7.

Note) Usage exceeding absolute maximum ratings may permanently impair the LSI. Normal operation should better take place under the recommended operating conditions. Exceeding those conditions may adversely affect the reliability of the LSI.

Recommended Operating Conditions (V_{SS} = 0V reference)

Item	Symbol	Min.	Max.	Unit	Remarks
Power supply voltage	V_{DD}	4.5	5.5	V	Guaranteed range during operation
		2.5	5.5		Guaranteed data hold operation range during STOP
Analog voltage	AV_{DD}	4.5	5.5	V	*1
High level input voltage	V_{IH}	0.7V_{DD}	V_{DD}	V	*2
	V_{IHS}	0.8V_{DD}	V_{DD}	V	CMOS schmitt input *3
	V_{IHTS}	2.2	V_{DD}	V	TTL schmitt input *4
	V_{IHEX}	V_{DD} – 0.4	V_{DD} + 0.3	V	EXTAL pin *5
Low level input voltage	V_{IL}	0	0.3V_{DD}	V	*2
	V_{ILS}	0	0.2V_{DD}	V	CMOS schmitt input *3
	V_{ILTS}	0	0.8	V	TTL schmitt input *4
	V_{ILEX}	–0.3	0.4	V	EXTAL pin *5
Operating temperature	Topr	–20	+75	°C	

*1 AV_{DD} and V_{DD} should be set to the same voltage.

*2 Normal input port (Each pin of PC, PD, PF and PH1).

*3 Each pin of $\overline{NMI}$, $\overline{CS0}$, SI0, $\overline{SCK0}$, $\overline{RST}$, PE0/$\overline{INT0}$, PE1/$\overline{EC}$/$\overline{INT2}$, PH0/$\overline{SCK1}$, PH2/SI1, PH3/$\overline{INT1}$/$\overline{CS1}$, PG and PK1/MCLK (when CMOS schmitt input is selected with mask option for PG, PK1/MCLK).

*4 Each pin of PG and PK1/MCLK (when TTL schmitt input is selected with mask option).

*5 Specified only during external clock input.

DC Characteristics (Ta = –20 to +75°C, V_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Typ.	Max.	Unit
High level output voltage	V_{OH}	PA to PD, PE2 to PE7, PH0, PH1, SO0, SCK0 PH4 to PH7 (V_{OL} only) RST*1 (V_{OL} only) PI to PK	V_{DD} = 4.5V, I_{OH} = –0.5mA	4.0			V
			V_{DD} = 4.5V, I_{OH} = –1.2mA	3.5			V
Low level output voltage	V_{OL}		V_{DD} = 4.5V, I_{OL} = 1.8mA			0.4	V
			V_{DD} = 4.5V, I_{OL} = 3.6mA			0.6	V
		PD, PH4 to PH7	V_{DD} = 4.5V, I_{OL} = 12.0mA			1.5	V
Input current	I_{IHE}	EXTAL	V_{DD} = 5.5V, V_{IH} = 5.5V	0.5		40	µA
	I_{ILE}		V_{DD} = 5.5V, V_{IL} = 0.4V	–0.5		–40	µA
	I_{ILR}	RST*2	V_{DD} = 5.5V, V_{IL} = 0.4V	–1.5		–400	µA
I/O leakage current	I_{IZ}	PA to PG PH0 to PH3, CS0, SI0, SO0, SCK0, NMI, RST*2 PI to PK*3	V_{DD} = 5.5V V_I = 0, 5.5V			±10	µA
Open drain output leakage current (N-ch Tr OFF in state)	I_{LOH}	PH4 to PH7	V_{DD} = 5.5V V_{OH} = 12V			50	µA
Current power supply	I_{DD}	V_{DD}	Operating mode (1/2 dividing clock) 12.288MHz crystal oscillation (C_1 = C_2 = 12pF) Entire output pins open		20	45	mA
	I_{DDSL}		Sleep mode		5	17	mA
	I_{DDST}		Stop mode			10	µA
Input capacity	C_{IN}	Other than V_{DD}, V_{SS}, AV_{DD}, and AV_{SS} pins	Clock 1MHz 0V other than the measured pins		10	20	pF

*1 RST pin specifies only when the power on reset circuit is selected with mask option.

*2 RST pin specifies the input current when the pull-up resistance is selected, and specifies leakage current when non-resistance is selected.

*3 PK0 pin specifies only when the normal input circuit is selected with mask option.

AC Characteristics

(1) Clock timing

(Ta = –20 to +75°C, V_{DD} = 4.5 to 5.5V, V_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Max.	Unit
System clock frequency	f_C	XTAL EXTAL	Fig. 1, Fig. 2	1	12.288	MHz
System clock input pulse width	t_{XL}, t_{XH}	EXTAL	Fig. 1, Fig. 2 External clock drive	36		ns
System clock input rising and falling times	t_{CR}, t_{CF}	EXTAL	Fig. 1, Fig. 2 External clock drive		200	ns
Event count input clock pulse width	t_{EH}, t_{EL}	$\overline{EC}$	Fig. 3	tsys + 50*1		ns
Event count input clock rising and falling times	t_{ER}, t_{EF}	$\overline{EC}$	Fig. 3		20	ms

*1 tsys indicates three values according to the contents of the clock control register (address : 00FE$_H$) upper 2 bits (CPU clock selection).
tsys [ns] = 2000/fc (Upper 2 bits = “00”), 4000/fc (Upper 2 bits = “01”), 16000/fc (Upper 2 bits = “11”)

Fig. 1. Clock timing

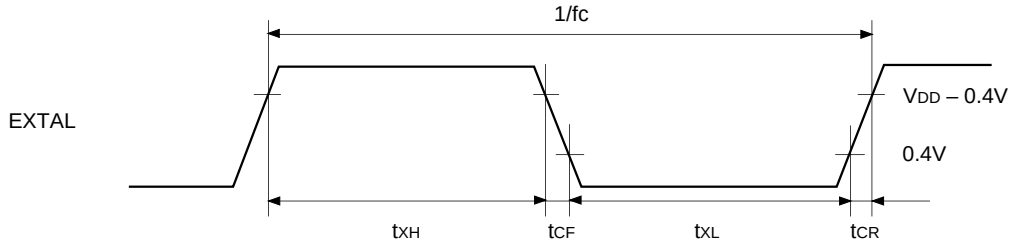


Fig. 2. Clock applying condition

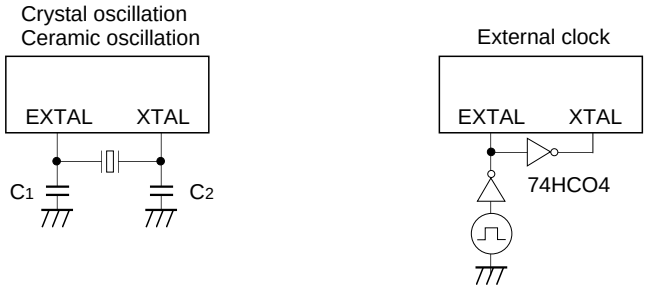
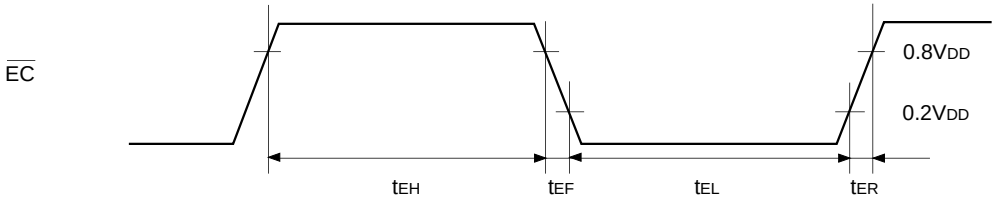


Fig. 3. Event count clock timing



(2) Serial transfer (Ta = –20 to +75°C, V_{DD} = 4.5 to 5.5V, V_{SS} = 0V reference)

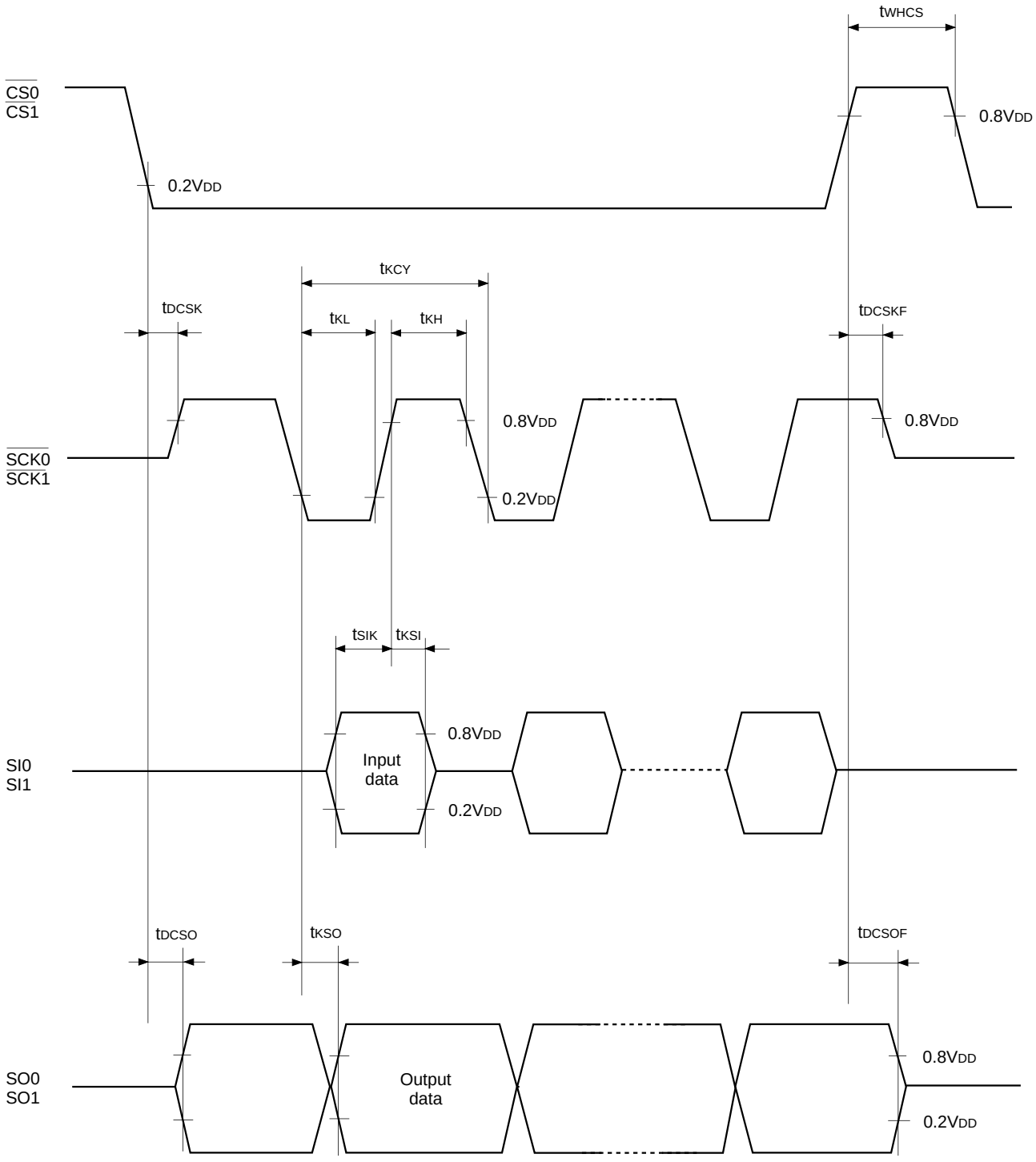
Item	Symbol	Pin	Condition	Min.	Max.	Unit
$\overline{CS}\downarrow \rightarrow \overline{SCK}$ delay time	t_{DCSK}	$\overline{SCK0}$, $\overline{SCK1}$	Chip select transfer mode ($\overline{SCK}$ = Output mode)		tsys + 200	ns
$\overline{CS}\uparrow \rightarrow \overline{SCK}$ floating delay time	t_{DCSKF}	$\overline{SCK0}$, $\overline{SCK1}$	Chip select transfer mode ($\overline{SCK}$ = Output mode)		tsys + 200	ns
$\overline{CS}\downarrow \rightarrow$ SO delay time	t_{DCSO}	SO0, SO1	Chip select transfer mode		tsys + 200	ns
$\overline{CS}\uparrow \rightarrow$ SO floating delay time	t_{DCSOF}	SO0, SO1	Chip select transfer mode		tsys + 200	ns
$\overline{CS}$ high level width	t_{WHCS}	CS0, CS1	Chip select transfer mode	tsys + 200		ns
$\overline{SCK}$ cycle time	t_{KCY}	$\overline{SCK0}$, $\overline{SCK1}$	Input mode	2tsys + 200		ns
			Output mode	8000/fc		ns
$\overline{SCK}$ high and low level widths	t_{KH} t_{KL}	$\overline{SCK0}$, $\overline{SCK1}$	Input mode	tsys + 100		ns
			Output mode	4000/fc – 50		ns
SI input setup time (against $\overline{SCK}\uparrow$)	t_{SIK}	SI0, SI1	$\overline{SCK}$ input mode	–tsys + 100		ns
			$\overline{SCK}$ output mode	200		ns
SI input hold time (against $\overline{SCK}\uparrow$)	t_{KSI}	SI0, SI1	$\overline{SCK}$ input mode	2tsys + 100		ns
			$\overline{SCK}$ output mode	100		ns
$\overline{SCK}\downarrow \rightarrow$ SO delay time	t_{KSO}	SO0, SO1	$\overline{SCK}$ input mode		2tsys + 200	ns
			$\overline{SCK}$ output mode		100	ns

Note 1) tsys indicates three values according to the contents of the clock control register (address : 00FE$_H$) upper 2 bits (CPU clock selection).
tsys [ns] = 2000/fc (Upper 2 bits = “00”), 4000/fc (Upper 2 bits = “01”), 16000/fc (Upper 2 bits = “11”)

Note 2) The marks $\overline{CS}$, $\overline{SCK}$, SI and SO respectivery mean pins of $\overline{CS} \rightarrow \overline{CS0}$, $\overline{CS1}$, $\overline{SCK} \rightarrow \overline{SCK0}$, $\overline{SCK1}$, SI → SI0, SI1 and SO → SO0, SO1.

Note 3) The load of $\overline{SCK}$ output mode and SO output delay time is 50pF + 1TTL.

Fig. 4. Serial transfer timing

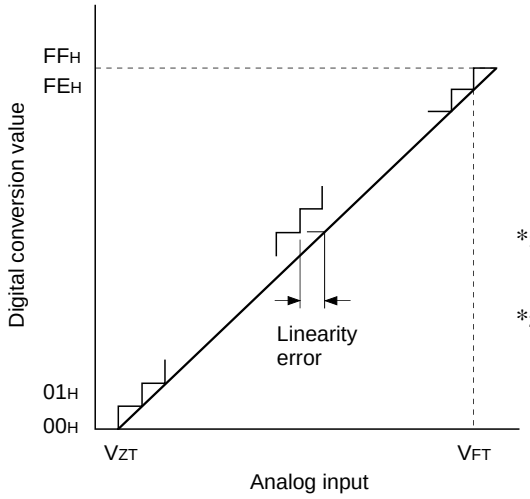


(3) A/D converter characteristics

(Ta = –20 to +75°C, V_{DD} = AV_{DD} = 4.5 to 5.5V, AV_{REF} = 4.0 to AV_{DD}, V_{SS} = AV_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Typ.	Max.	Unit
Resolution						8	bits
Linearity error			Ta = 25°C V_{DD} = AV_{DD} = 5.0V V_{SS} = AV_{SS} = 0V			±1	LSB
Zero transition voltage	V_{ZT}*1			–10	30	70	mV
Full scale transition voltage	V_{FT}*2			4930	4970	5010	mV
Conversion time	t_{CONV}			160/f_C			µs
Sampling time	t_{SAMP}			12/f_C			µs
Reference input voltage	V_{REF}	AV_{REF}		AV_{DD} – 0.5		AV_{DD}	V
Analog input voltage	V_{IAN}	AN0 to AN7		0		AV_{REF}	V
AV_{REF} current	I_{REF}	AV_{REF}	Operating mode		0.6	1.0	mA
	I_{REFS}		Sleep mode Stop mode			10	µA

Fig. 5. Definitions of A/D converter terms



*1 V_{ZT} : Indicates the value that digital conversion value changes from 00_H to 01_H and vice versa.

*2 V_{FT} : Indicates the value that digital conversion value changes from FE_H to FF_H and vice versa.

(4) Interruption, reset input (Ta = –20 to +75°C, V_{DD} = 4.5 to 5.5V, V_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Max.	Unit
External interruption high and low level widths	t_{IH} t_{IL}	$\overline{INT0}$ $\overline{INT1}$ $\overline{INT2}$ $\overline{NMI}$		1		µs
Reset input low level width	t_{RSL}	$\overline{RST}$		8/fc		µs

Fig. 6. Interruption input timing

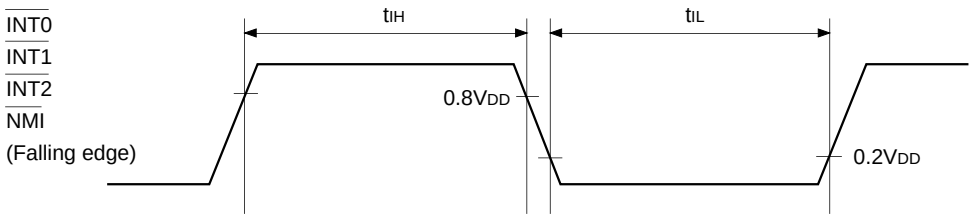
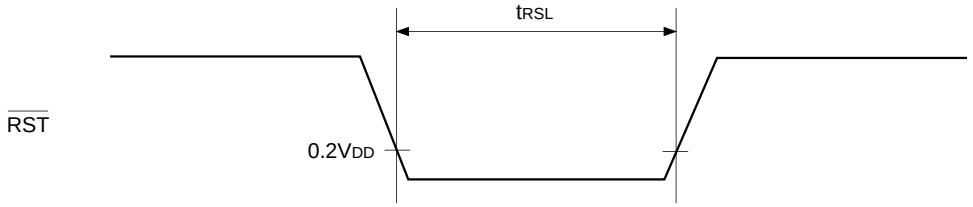


Fig. 7. $\overline{RST}$ input timing



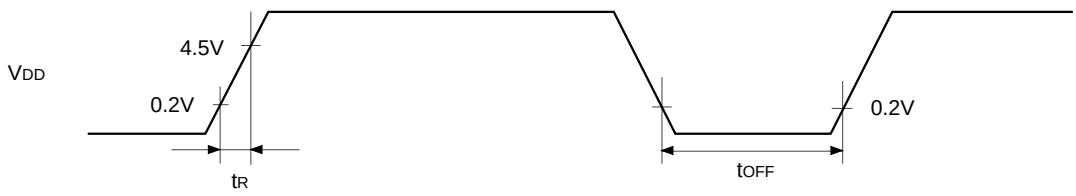
(5) Power on reset

Power on reset* (Ta = –20 to +75°C, V_{DD} = 4.5 to 5.5V, V_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Max.	Unit
Power supply rising time	t_R	V_{DD}	Power on reset	0.05	50	ms
Power supply cut-off time	t_{OFF}		Repetitive power on reset	1		ms

* Specifies only when power on reset function is selected.

Fig. 8. Power on reset



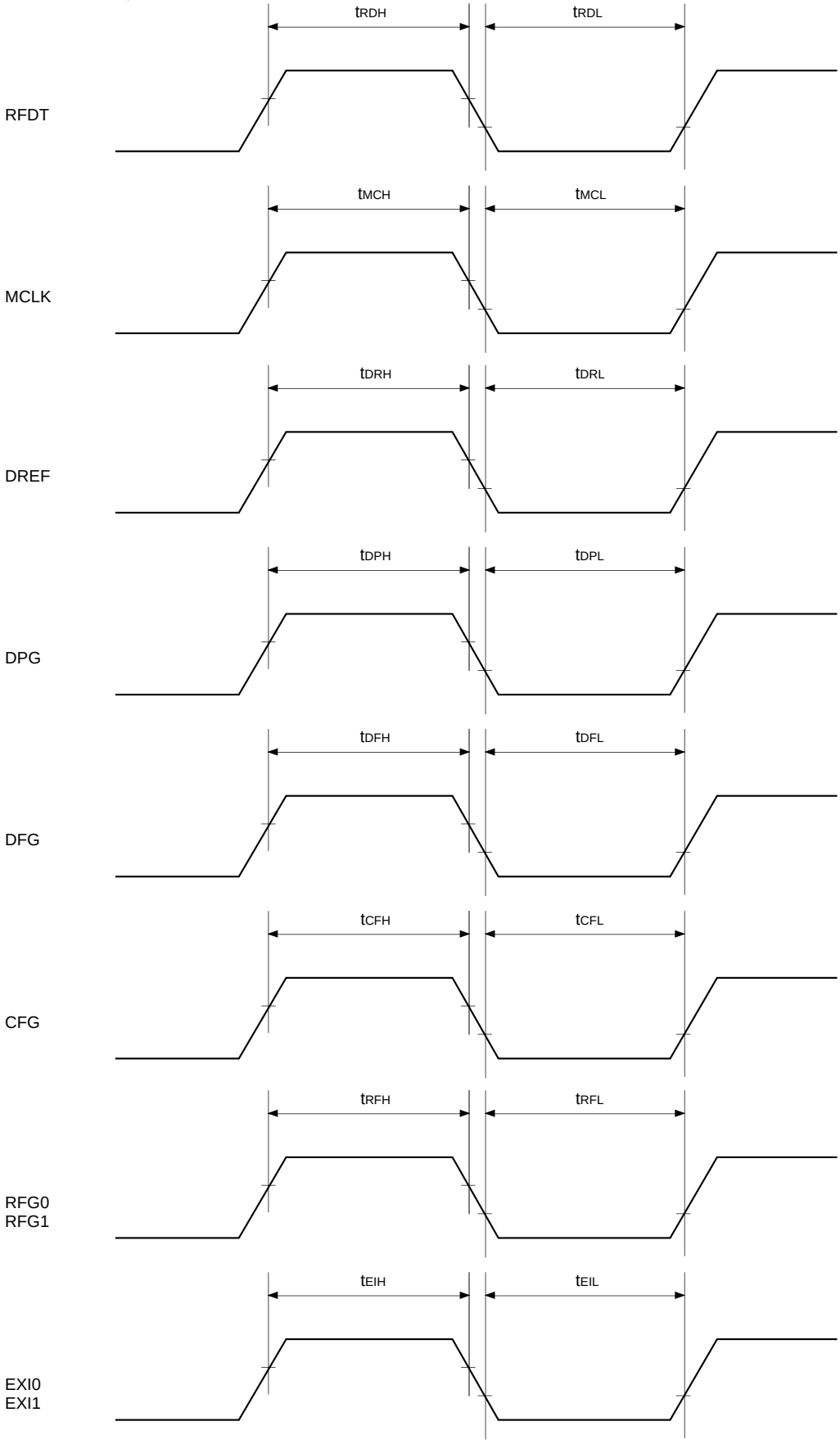
The power supply should rise smoothly.

(6) Others (Ta = –20 to +75°C, V_{DD} = 4.5 to 5.5V, V_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Max.	Unit
RFDT input high and low level widths	t_{RDH} t_{RDL}	RFDT		$2.5t_{MCK}$*1		ns
MCLK input high and low level widths	t_{MCH} t_{MCL}	MCLK		326/fc		ns
DREF input high and low level widths	t_{DRH} t_{DRL}	DREF		tsys + 200		ns
DPG input high and low level widths	t_{DPH} t_{DPL}	DPG		tsys + 200		ns
DFG input high and low level widths	t_{DFH} t_{DFL}	DFG		tsys + 200		ns
CFG input high and low level widths	t_{CFH} t_{CFL}	CFG		tsys + 200		ns
RFG input high and low level widths	t_{RFH} t_{RFL}	RFG0 RFG1		tsys + 200		ns
EXI input high and low level widths	t_{EIH} t_{EIL}	EXI0 EXI1	tsys = 2000/fc	tsys + 200		ns

*1 t_{MCK} indicates three values according to the contents of the ATF control register (address : $01EE_H$) bits 5 and 4 (MCLK input control).
t_{MCK} [ns] = t_{MCH} or t_{MCL} (bits 5 and 4 = “00”), $2t_{MCH}$ or $2t_{MCL}$ (bits 5 and 4 = “01”), $4t_{MCH}$ or $4t_{MCL}$ (bits 5 and 4 = “10”).

Fig. 9. Other timing

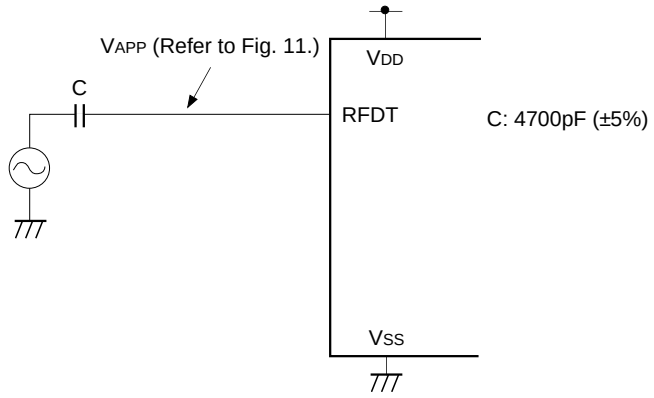


(7) Buffer amplifier function (Ta = –20 to +75°C, V_{DD} = 4.5 to 5.5V, V_{SS} = 0V reference)

Item	Symbol	Pin	Condition	Min.	Max.	Unit
Buffer amplifier input voltage*1 (Peak to peak value)	V_{APP}	RFDT	When inputting 400kHz sine wave on Fig. 10 circuit.	2.0	V_{DD} + 0.3	V

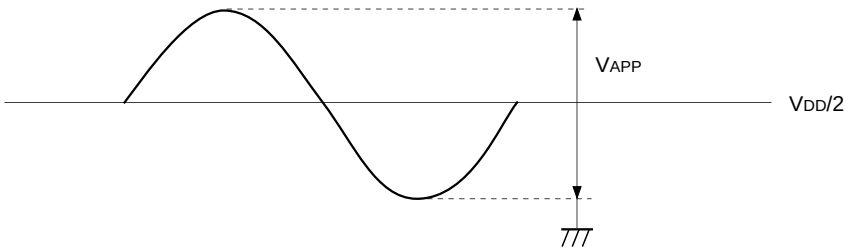
*1 When buffer amplifier input circuit format of RFDT pin is selected with option.

Fig. 10.



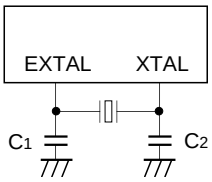
Note) V_{APP} waveform indicates the range like Fig. 11. When composed by circuits other than Fig. 10. (when DC bias does not become $V_{DD}/2$), it should not exceed V_{DD} + 0.3 (V) and –0.3 (V) (V_{SS} = 0V).

Fig. 11.



Supplement

Fig. 12. SPC700 series recommended oscillation circuit



Manufacturer	Model	Frequency f (MHz)	C_1, C_2 (pF)
RIVER ELETEC CORPORATION	HC-49/U-03	6.00	12
		8.00	12
		12.000	10

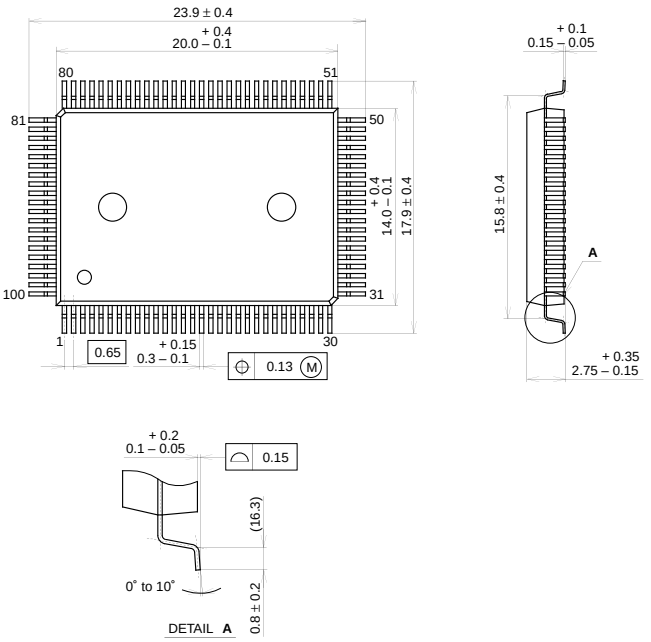
Mask option table

Item	Contents	
Reset pin pull-up resistor	Non-existent	Existent
Power on reset circuit	Non-existent	Existent
Input circuit format*1	CMOS Schmitt	TTL Schmitt
	Buffer amplifier	Normal input

*1 On PG0/EXI0 pin to PG7/RFG1 pin and PK1/MCLK pin, the input circuit format of CMOS schmitt or TTL schmitt can be selected to every pin.
On PK0/RFDT pin, buffer amplifier or normal input circuit format can be selected.

Package Outline Unit: mm

100PIN QFP (PLASTIC)



PACKAGE STRUCTURE

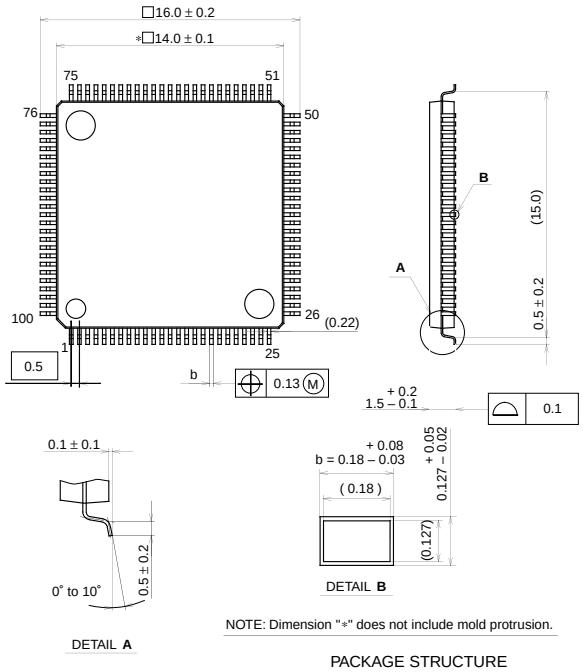
SONY CODE	QFP-100P-L01
EIAJ CODE	QFP100-P-1420
JEDEC CODE	————

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42/COPPER ALLOY
PACKAGE MASS	1.7g

Package Outline

Unit: mm

100PIN LQFP (PLASTIC)



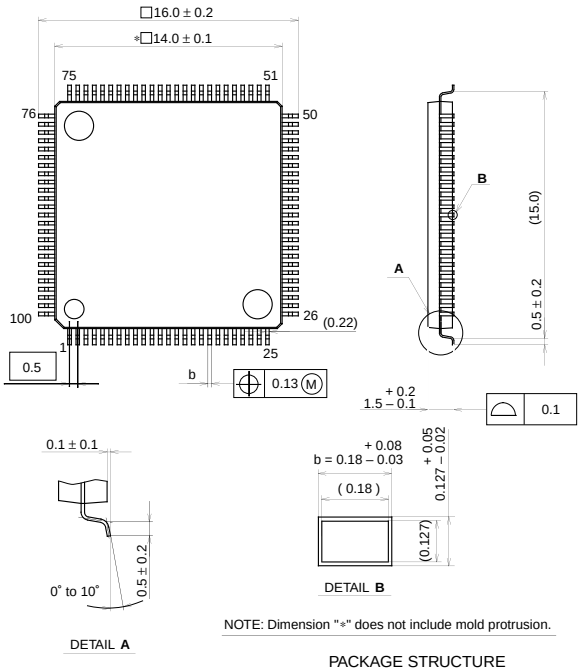
NOTE: Dimension "*" does not include mold protrusion.

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42 / COPPER ALLOY
PACKAGE MASS	0.7g

SONY CODE	LQFP-100P-L01
EIAJ CODE	P-LQFP100-14x14-0.5
JEDEC CODE	————

100PIN LQFP (PLASTIC)



NOTE: Dimension "*" does not include mold protrusion.

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42 / COPPER ALLOY
PACKAGE MASS	0.7g

SONY CODE	LQFP-100P-L01
EIAJ CODE	P-LQFP100-14x14-0.5
JEDEC CODE	————

LEAD SPECIFICATIONS

ITEM	SPEC.
LEAD MATERIAL	COPPER ALLOY
LEAD TREATMENT	Sn-Bi 2.5%
LEAD TREATMENT THICKNESS	5-18µm